

REMARKS

Applicant has now had an opportunity to carefully consider the Examiner's comments set forth in the Office Action mailed December 16, 2005. All of the rejections are respectfully traversed. Re-examination and reconsideration of the application in light of the foregoing amendments and subsequent remarks is respectfully requested.

The Office Action

All claims of the application were rejected for being anticipated by or failing to define nonobvious subject matter over the teachings of selected prior art references.

The Present Application

A method and system is provided for selectively controlling supplied power to an ink melt heater for maintaining a desired ink melt rate despite a varying ambient parameter affecting the actual melt rate. A predetermined amount of power is initially supplied to the melt heater intended to cause a desired ink melt rate. An ambient parameter is detected and a determination is made if the detected ambient parameter will cause a variance in the actual ink melt rate from the desired ink melt rate. If a variance is so determined, the supplied power is adjusted in accordance with a temperature correction factor from the predetermined amount to an adjusted amount for realizing the desired ink melt rate. The ambient parameter preferably comprises sensing a factor representative of at least one of local environmental air temperature to the printing system or adjacent ink temperature to the heat plate. The temperature correction factor allows for the selective adjustment in accordance with effectively infinite variant of the melt rate to provide an offset adjustment in the supplied power in a corresponding wide variety of variances.

The References

Although the Kanemoto '991 reference states a "finely controlled temperature of melt ink" at col. 1, line 63-65, the '991 reference teaches a simple on/off system for supplying power to the two heat sources. This reference teaches an AC source for high heat (transforming print stick from solid to molten state) and a DC source for low heat (for maintaining the ink at a molten state). This reference uses a simple discrete ON\

OFF system much like a thermostat where the AC and DC power supplies are "enabled and disabled" when they reach a desired temperature. ('991 col. 3 lines 45-52.)

Applicant's claim one includes "selectively controlling supplied power to an ink melt heater" which refers to a varied power supply. The Applicant's specification also includes reference to adjusting the power to the heater plate. See [0026] Applicant distinguishes his claims from the previous art in the area based on the fact that he claims a "selectively controlled supplied power" or variable power supply for. Applicant's Background [0004] disclosed that the "conventional systems used a fixed applied power supply" and that the heating elements "receive only a single level of applied power." This is in fact what the '991 reference teaches. The use of the variable power supply is in part what distinguishes Applicant's claims from the prior art.

In addition, the last clause of claim 1 states "adjusting supplied power from the predetermined amount to an adjusted amount for realizing the desired ink melt rate." This clause specifically claims a variable power means that adjusts power supplied to the heating elements from one power setting to at least one other power setting. The '991 reference only teaches an ON/OFF system for adjusting power.

The Examiner's reference appears to teach a "heat control means controls the DC power supplying means so that the optimum temperature of the ink is maintained." ('991 col. 3, lines 57-59.) The reference does not detail a variable power supply for the DC circuit. Temperature control in the '991 reference for AC and DC power is accomplished through turning the heating elements on and off. Even if the reference did teach the DC heating element's use of a variable power source, the DC element is used for maintaining the desired ink temperature, while the Applicant's claims are also directed toward a system which increases the temperature of the ink to the desired temperature and takes into account the ambient temperature at the start of the heating cycle or, as in claim 3, prior to the start of the heating cycle. The differences between heating to attain the desired temperature (while taking into account the ambient temperature) and maintaining the desired temperature once it has been reached are significant and distinguish the Applicant's claims from the '991 reference's teachings involving the DC heating circuit. Heating of the ink to the desired temperature is analogous with the '991 reference's use of the AC heater, which is used for heating up to the desired temperature. No where in the '991 reference is there any teaching of variable power supply for the AC ink melt heater which adjusts the rate of heating when

attempting to attain, not maintain, the desired temperature. In the '991 reference in Fig. 8, there is a voltage control device 54, however this device is used to control the piezo electric element, not the heaters.

In addition, the claims have been amended to now include the limitation of varying the power in accordance with a calculated correction factor to further emphasize the variety of possible variance of the applied power over the essentially binary teaching of the '991 reference. Since the variance in melt rate by the ambient parameter is effectively infinite, the corresponding offset needs to be widely variable also.

In addition, the Applicant claims the use of an ambient parameter to determine the power output to the heating elements. No where in the '991 reference is there any reference to the ambient parameter or temperature. This includes the Examiner's reference to col. 3, lines 30-61. Ambient parameter includes the ambient temperature which is sensed by the temperature sensor when the heating element has been turned off for 45 minutes to an hour which is the amount of time required for the cool down on the ink duty cycle. See [0023] and amended claim 13. This allows the use of a single sensor in the ink system to detect ambient temperature. The ambient parameter may comprise sensing a factor representative of either local environmental air temperature or ink temperature adjacent to the ink melt heater. See [0006] and amended claim 13. The ambient parameter is important because in the case of a cool down, the surrounding or ambient temperature can cause the printer contents to be cooled to a below normal temperature. In many cases the printer is in an out of office environment, such as an unheated warehouse or desert aircraft hangar. See [0004]. In these cases extreme ambient conditions can affect the flow rate in the heating process which cause variances in ink melt rates. By taking these varying ambient temperatures into account the power to the ink melt heater may be adjusted or "selectively controlled supplied power to an ink melt heater," which will improve precision and efficiencies of ink flow rates. The Applicant's use of the ambient parameter for adjusting ink melt heating is unique and not taught anywhere in the '991 reference. Instead, the '991 reference simply turns the power supply on when a desired temperature is reached but does not take into account the starting or ambient temperature of the ink to determine the rate at which heat is to be applied. The Applicant's use of the ambient parameter to determine the power level at the start of the heating cycle makes it unique. Claim 3 specifies the sensing of the ambient parameter before the startup of the heating cycle.

In addition, the '991 reference teaches the use of two heaters, one for attaining the desired temperature (AC) and another for maintaining the desired temperature (DC). The Applicant claims a device which uses only one heater that does both attaining the desired temperature (see Applicant's amendment on claim 1) and maintaining the desired temperature with associated ink melt rate. The use of a single heater allows for cost savings in manufacturing of the printer. This is accomplished through the use of a variable power source which provides different levels of heating for attaining and maintaining in addition to allowing for different power levels due to ambient temperature.

Since the Applicant's claim 1 is directed toward heating ink to the desired temperature, using a variable power source, a single heating element, and taking into account the ambient temperature Applicant respectfully argues that his first claim is not anticipated by the '991 reference and requests that the Examiner make the claim ready for allowance.

Claim 2

Although the use of the "ambient parameter" is further defined in claim 2 as "at least one of local environmental air temperature or adjacent ink temperature," this definition is similar to the definition of "ambient parameter" in the specification. "The ambient parameter may comprise sensing a factor representative of either local environmental air temperature or ink temperature adjacent to the ink melt heater." See [0006] The Applicant's arguments regarding "ambient parameter" differentiating his claim 1 from the '991 reference are more relevant to claim 2 because "ambient parameter" is further defined in claim 2. Neither of the Applicant's definitions of ambient parameter claimed in claim 2 are taught by the '991 reference cited by the Examiner. The Applicant respectfully requests that the Examiner remove is rejection and make claim 2 ready for allowance.

Claim 3

The Applicant argues that sensing of the adjacent ink temperature being made prior to the start of a melt duty cycle is not anticipated by the '991 reference in col. 7 or col. 8. No where can the Applicant find any teaching toward sensing before the start of the melt duty cycle. The Examiner's cited reference does refer to the start up at col. 8

line 12, however there is no teaching in of sensing before the startup. Sensing before the startup of the cycle is therefore not anticipated by the '991 reference. Therefore, the Applicant respectfully requests that the Examiner remove is rejection and make claim 3 ready for allowance.

Claim 4

The Examiner in his rejection states that the control circuit and power supply are anticipated by '991 at col. 3, lines 21-61. The last clause of claim 4 states "a sensor for sensing a parameter consequential to an ink melt rate wherein the control circuit adjusts the supplied energy during a melt duty cycle to compensate for a consequential effect of the sensed parameter." Applicant in claim 1 has argued why the '991 reference does not teach the use of an adjustable power supply or the use of sensing of the ambient parameter or temperature in the control system to determine the initial output of the ink melt system.

The two elements of the adjustable power supply and the sensed parameter make claim 4 distinct from the '991 reference for the same reasons argued above in claim 1. Therefore, the Applicant respectfully argues that claim 4 is not anticipated and requests that the Examiner remove the rejection and make the claim ready for allowance.

Claim 5

The Applicant argues that sensing of the adjacent ink temperature being made prior to the start of a melt duty cycle is not anticipated by the '991 reference in col. 7 or col. 8. No where can the Applicant find any teaching toward sensing before the start of the melt duty cycle. The Examiner's cited reference does refer to the "start up" at col. 8 line 12, however there is no teaching in of sensing before the startup of the heating operation is begun.

Claim 10

Applicant has, in part, amended his claim 10 in order to clarify that the sensed parameter is in fact the ambient parameter.

Because the Applicant claims the use of an ambient parameter to determine the power output to the heating elements it is asserted that his claim 10 is not anticipated.

No where in the '991 reference is there any reference to the ambient parameter or temperature. This includes the Examiner's reference to col. 3, lines 30-61. Ambient parameter includes the ambient temperature which is sensed by the temperature sensor when the heating element has been turned off for 45 minutes to an hour which is the amount of time required for the cool down on the ink duty cycle. See [0023].

The ambient parameter may comprise sensing a factor representative of either local environmental air temperature (ambient temperature) or ink temperature adjacent to the ink melt heater. See [0006] The ambient parameter is important because in the case of a cool down, the surrounding or ambient temperature can cause the printer contents to be cooled to a temperature below normally encountered. In many cases the printer is in an out of office environment, such as an unheated warehouse or desert aircraft hangar. See [0004]. In these cases extreme ambient conditions can affect the flow rate in the heating process which cause variances in ink melt rates. By taking these varying ambient temperatures into account the power to the ink melt heater may be adjusted or "selectively controlled supplied power to an ink melt heater," which will improve precision and efficiencies of ink flow rates. The Applicant's use of the ambient parameter for adjusting ink melt heating is unique and not taught by the '991 reference. Instead, the '991 reference simply turns the power supply off when a desired temperature is reached but does not take into account the starting or ambient temperature of the ink to determine the rate at which heat is to be applied. The Applicant's use of the ambient parameter to determine the power level at the start of the heating cycle makes it unique.

In addition claim 10 claims a "control circuit for adjusting the supplied energy to the heating means" which is a variable power source. Applicant's new claim 15 further defines the meaning of the variable power source. The use of a variable power source, which has at least two power settings, is not taught in the '991 reference used by the Examiner. The Applicant in claim 1 has detailed this argument and why a variable power source is different from the teaching of the '991 reference.

Since the Applicant's claim 10 is directed toward heating ink to the desired temperature, using a variable power source and taking into account the ambient temperature Applicant respectfully argues that his first claim is not anticipated by the '991 reference and requests that the Examiner make the claim ready for allowance.

35 U.S.C. §103

The Examiner cites Kanemoto 5,992,991 ('991) in view of Tanaka JP6127769 (769') by Tanaka for his 103 rejection of Applicant's claims. Applicant argues the following:

Suggestion or Motivation to Combine

"There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998), MPEP §2143.01

The Applicant's claims are directed at an "ink melt system," however there is no indication that the 769' reference is directed at melting solid ink, instead it appears to be directed at a controller for applying ink. This is bolstered by the fact that correction data, which uses the ambient temperature, is applied to the "level of signal of one gradation data time period" for the purpose of "gradation density control." Gradation is according to Merriam-Webster Online Dictionary "a gradual passing from one tint or shade to another." Application of correction data to the tint or shade data indicates that the correction factor is being applied to the application of ink, such as an ink jet mechanism. Applicant is claiming a device for adjusting the heat applied to for the ink melt rate of the toner or solid ink to be used by the ink jet, not a device for correcting ink jet application due to the ambient environment which is what is being taught in the '769 reference by the Examiner. This is further evidenced by the fact that the '769 reference details the correction data and signal for gradation data time period to be "the width of a pulse outputted from a comparator 23." The pulse duration and amplitude refer to the spraying of ink from the ink jet. The Applicant's heater does not use pulses for gradation purposes such as the application of ink with an ink jet, instead it attempts to attain and maintain ink at a desired temperature and flow rate for use by an ink jet. Application of the '769 reference also requires one to apply art that is directed toward pulse signals (see "width of a pulse outputted from a comparator) to a heater which does not use pulses.

In addition, the '769 reference itself teach that problems encountered in shading or gradation are due to ambient conditions affecting the ink jet which may be corrected by correcting the pulse duration and amplitude using a correction factor that takes into

account ambient conditions. The '769 reference therefore teaches away from correcting other factors such as the solid ink melt rate in favor of correcting the amplitude and pulse duration of the ink jet.

It would therefore not be obvious for one skilled in the art to apply the '769 reference teaching correction factors based on ambient conditions for ink application to the art of melting solid ink because they for use. Therefore, the Applicant respectfully requests that the Examiner remove the 35 U.S.C. §103 rejection and make claims 6, 7, and 13 ready for allowance.

Expectation of Success

The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986), MPEP §2143.02. In addition, because the areas of art in the '769 reference and the Applicant's claims are so different there is no reasonable expectation of success. The solutions to problems encountered in correcting shading in an ink jet do not give us an expectation that the solution will work when applied to melting of solid ink. In fact discovery of the need for the Applicant's solution would not be as obvious as the discovery of problems in the ink jet itself.

It may be intuitive that ambient conditions would cause an ink jet to behave differently, especially when the problem can be easily seen (poor print quality) when the printer is operated in different ambient environments. However, it may be very difficult to determine what if any effect the ink melt rate would have on the final product because the ink melt feeds the ink jet which one would first assume is causing the printing problems. Because the problems would initially be thought to be caused by the ink jet itself, identification of issues resulting from poor ink melt rate conditions would not be obvious to one in the art. Therefore, identification of issues caused by varying ink melt rates will be more difficult to determine problem source than identification of issues involving ink jet application.

In addition, the area of art are so different that there would be no reasonable expectation of success. Therefore, the Applicant respectfully requests that the Examiner remove the 35 U.S.C. §103 rejection and make claims 6, 7, and 13 ready for allowance.

All Limitations Rule

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974), MPEP §2143.03.

Claim 6

Applicant argues that the '769 reference does not teach the use of a factor "representative of convection losses to the heater." The Examiner's reference appears to teach the use of ambient temperature in determining a correction factor. Although ambient temperature is mentioned, there is no teaching of factors representative of convection losses in the system. Therefore, the Applicant argues that the '769 reference does not teach the limitation claimed by the Applicant and therefore violates the requirements under MPEP §2143.03.

Claim 13

Applicant has amended claim 13 to clarify the meanings of the periods used to make determinations of conditions to further describe "ambient temperature" and the "starting temperature of the ink stick." Applicant respectfully argues that the '991 reference does not teach taking readings before startup of the heating process, and furthermore that it does not differentiate between taking "ambient temperature" readings (those after cool down) and "starting temperature of the ink stick" (readings before the cool down cycle has completed).

Therefore, the Applicant respectfully requests that the Examiner remove the 35 U.S.C. §103 rejection and make claims 6, 7, and 13 ready for allowance.

CONCLUSION

For the reasons detailed above, it is submitted all claims remaining in the application (Claims 1-16) are now in condition for allowance. The foregoing comments do not require unnecessary additional search or examination.

No additional fee is believed to be required for this Amendment A. However, the undersigned attorney of record hereby authorizes the charging of any necessary fees, other than the issue fee, to Xerox Deposit Account No. 24-0037.

In the event the Examiner considers personal contact advantageous to the

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Amendment dated March 16, 2006
Reply to Office Action of December 16, 2005

disposition of this case, he/she is hereby authorized to call Patrick R. Roche, at
Telephone Number (216) 861-5582.

Respectfully submitted,

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